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NASA TECH BRIEF

Langley Research Center

Domestic Wash Water Reclamation

A combined filtration/reverse-osmosis water recovery system has been tested at the Langley Research Center. While the system does not produce drinking water, the water is thought to be of sufficient quality to be reused as commode water supply. The increase in demand for sources of water to supply the increasing population and industrial needs makes the application of this system particularly attractive for reclaiming wash water for reuse.

The system has been tested in a simulated average-size household by reclaiming water from shower baths and clothes washing for reuse as commode water supply. Wash water was recovered at the rate of approximately 81 gallons per hour (307 liters per hour) at a total power consumption of 0.07 kilowatt-hour per gallon (0.02 kilowatt-hour per liter).

This water reclamation system consists of a filtration unit, a reverse-osmosis module, tanks, pumps, plumbing, and various gauges, meters, and valves. After the water is used in the washing machine and the shower, it is collected in a holding tank. The wash water then is pumped through a series of five particulate filters. The filter sizes are 50, 25, 10, 5, and 1 micrometers; the filters are arranged in the order given to protect the reverse-osmosis unit from plugging. The filtered water is collected in a second holding tank. It then is processed through the reverse-osmosis unit which contains a membrane module fabricated from asymetric hollow fibers. The fibers are made from an aromatic polyamide polymer.

The reverse-osmosis unit is operated with a recycle loop in order to control water pressure within the module and to obtain multipasses of the filtered water through the unit. The processed water is collected in a third holding tank. The water then is chlorinated to reduce the micro-organism population. A jet pump/pressure tank arrangement is used to supply the processed water automatically to the commode water closet, as required.

Notes:

1. The following documentation may be obtained from:
   National Technical Information Service
   Springfield, Virginia 22151
   Single document price $3.25
   (or microfiche $2.25)
   Reference: NASA TN-D-7600 (N74-19607), Domestic Wash Water Reclamation for Reuse as Commode Water Supply using a Filtration-Reverse Osmosis Separation Technique.
2. Technical questions may be directed to:
   Technology Utilization Officer
   Langley Research Center
   Mail Stop 139-A
   Hampton, Virginia 23665
   Reference: B74-10177

Patent status:

NASA has decided not to apply for a patent.

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